



Carbon Finance and India

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ABSTRACT

Finance is a strategic decision making area where risk and return goes hand in hand. In this complex environment, global village concept has a wide range of responsibilities and opportunities. A new threat to business today i.e. commitment to countries to reduce pollution because of global warming is converted in to a opportunity by creating a market mechanism through CLEAN DEVELOPMENT MECHANISM (CDM). As a new branch of Environmental finance Carbon finance is applied to investments in GHG emission reduction projects and the creation of financial instruments that are tradable on the carbon market. The paper deals with the basic concepts involved in carbon finance primarily with how various CDM project is financed and the benefits of financing for both host countries and home countries . As a part of analysis a bilateral railway project is considered to understanding funding pattern and in a way they get carbon credits. The parties involved are DMRC AND JAPAN CARBON FINANCE LIMITED.

Key words: clean development mechanism , Carbon finance, bilateral railway project, DMRC

INTRODUCTION

Carbon finance explores the financial implications of emissions of carbon dioxide and other greenhouse gases (GHGs) carry a price. Financial risks and opportunities impact corporate balance sheets, and market-based instruments are capable of transferring environmental risk and achieving environmental objectives. It is the use of various financial instruments (most notably land trusts and [Emissions trading]) to protect the environment. The field is part of both environmental economics and the conservation movement.

SCOPE OF THE STUDY

The study is to understand the concept of carbon finance with special reference to DELHI METRO RAIL CORPORATION.

OBJECTIVES OF THE STUDY

The objective of this study is to:

- To study the concept of carbon finance.
- To study the importance of carbon finance.
- To analyze the financial feasibility and funding patterns of DMRC CDM projects carbon finance.

RESEARCH METHODOLOGY

The methodology in the whole study is descriptive in nature with the use of secondary data. Graphs have been made use of, for the purpose of studying and analyzing the concept of CDM and carbon finance. It provides a better understanding of the same for the reader.

DATA SOURCES

Secondary data is the data that have been already collected by and readily available from other sources. The sources of this project has been selected from annual reports, Project design document, Articles and websites.



LIMITATIONS OF THE STUDY

The study is confined only to CDM and carbon finance in Delhi metro rail corporation. The generalizations are based on three financial years only. Since the study is based on secondary data the validity of results depends on accuracy of data.

LITERATURE REVIEW

INTRODUCTION

The United Nations Framework Convention on Climate Change (UNFCCC or FCCC) is an international environmental treaty produced at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro from June 3 to 14, 1992.

KYOTO PROTOCOL.

The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC or FCCC), which aimed at fighting global warming. The Protocol was initially adopted on 11 December 1997 in Kyoto, Japan, and entered into force on 16 February 2005. Under the Protocol, 37 countries (“Annex I countries”) commit themselves to a reduction of four greenhouse gases (GHG). The Protocol allows for several “flexible mechanisms”, such as emissions trading, the clean development mechanism (CDM) and joint implementation to allow Annex I countries to meet their GHG emission limitations by purchasing GHG emission reductions credits from elsewhere, through financial exchanges, projects that reduce emissions in non-Annex I countries, from other Annex I countries, or from annex I countries with excess allowances

CARBON FINANCE

With the rapidly expansion scale of the global “carbon emissions” demands and carbon trading market, scholars and politicians are paid high attention to “carbon finance” in the world. At present, scholars and politicians have explained “carbon finance” from different angles, but no one can be universally accepted. These connotation can be Summarized as follows.

The carbon finance refers to all financial services on limiting greenhouse gas emissions,, including direct investment and financing, carbon credits trading and bank loans.

Definition of Carbon Finance

Carbon finance is defined as investment and financing activities in low-carbon economy field based on “Kyoto Protocol” or carbon financing and carbon substances trading. Namely the financial activities such as direct investment and financing, carbon trading and bank loans used to serve to limit greenhouse gas emissions technology and projects.

CDM Projects financing

CDM projects can be considered as any other projects with the exception that CDM projects deliver CERs as additional by-products. Usually a CDM project requires huge investment, costly technology and has to cover CDM related transaction costs. The CERs generated by the CDM project are sold to a CER buyer, thus generating an additional source of income for the project making the additional costs possible. When purchasing CERs an emission reduction purchase agreement (ERPA) is made which covers the details of the transaction.

CDM projects can be divided to three groups according to the type of cooperation with financiers /type of financing: unilateral, bilateral, and multilateral projects. The industrial actor in the non-Annex I country can execute the project activity all by itself, in which case the project activity is called unilateral. If a party from the Annex I country takes part in the project through funding, a project is called bilateral. Multilateral projects can be seen as bilateral projects where a third party takes care of the finance. An example of a multilateral fund is the Prototype Carbon Fund from the World Bank.



DELHI METRO RAIL CORPORATION (DMRC)

Introduction

For implementation and subsequent operation of Delhi MRTS, a company under the name DELHI METRO RAIL CORPORATION was registered on 03-05-95 under the Companies Act, 1956. DMRC has equal equity participation from GOI and GNCTD.

CLEAN DEVELOPMENT MECHANISM IN DMRC

PROJECT 1 :Installation of Low Green House Gases (GHG) emitting rolling stock cars in metro system

PROJECT PARTICIPANTS: INDIA (DMRC), JAPAN (JAPAN CARBON FINANCE LIMITED)

The purpose of the project activity is to install low GHG emitting rolling stocks having regenerative braking system in Delhi Metro Rail Corporation (DMRC). The other metro in the country i.e. Kolkata metro uses the conventional rheostatic braking technology. The project activity replaces the conventional electro-dynamic rheostatic braking technology, with regenerative braking technology fitted rolling stocks. The regenerated electrical energy is used by other rolling stocks on the line operating in powering mode. The regenerated electrical energy reduces the consumption of equivalent grid electrical energy required by the powering trains, thereby conserving electrical energy and subsequently leading to GHG emission reduction.

Annual Estimation of emission reduction (in tonnes of CO₂e) is 41,160 for 10 years

project activity – 2 : Metro Delhi, India 20/01/2011

In the project situation the metro complements other modes of transport and replaces partially trips made by conventional or traditional means of transit by metro. The CDM project replaces trips made by conventional transport modes with metro, being a more efficient, faster, safer and more reliable transport means

PROJECT PARTICIPANTS: INDIA (DMRC), SWITZERLAND(Grütter Consulting AG)

CARBON FINANCE IN DMRC

The Project activity is partly financed by the Government of Japan through JBIC. The funding however is separate from and is not counted towards the financial obligations of the aforesaid party. The relevant documents have been submitted to the valuator.

Japan International Cooperation Agency (JICA) formerly known as Japan Bank for International Cooperation (JBIC) has committed to provide total loan of 16, 27,510 lakhs Japanese yen in six tranches for phase I and 21,19,760 lakhs Japanese yen in 4 tranches for phase II to the GOI for implementation of Delhi Mass Rapid Transit System project by DMRC as the executing agency for the implementation of project as details given below

Phase – I

First tranche in February 1997 of 147600 lakhs Japanese yen. Second tranche in march 2001 of 67320 lakhs Japanese yen. Third tranche in February 2002 of 286590 lakhs Japanese yen. Fourth tranche in march 2003 of 340120 lakhs Japanese yen . Fifth tranche in march 2004 of 592960 lakhs Japanese yen . Sixth tranche in march 2005 of 192920 lakhs Japanese yen .

Phase – II

First tranche in march 2006 of 149000 lakhs Japanese yen . Second tranche in march 2007 of 135830 lakhs Japanese yen . Third tranche in march 2008 of 721000 lakhs Japanese yen . Fourth tranche in march 2009 of 777530 lakhs Japanese yen . Fifth tranche in march 2010 of 336400 lakhs Japanese yen .

AGREEMENT TO SALE OF CARBON CREDITS

An agreement to sale of carbon credits earned by DMRC CDM projects “Emission Reduction by Low GHG emitting vehicles” has been entered with Japan carbon finance ltd .



However the sale of carbon credits would earn an extra income of 1.2 crores p.a to DMRC and would help Japan to meet its Kyoto requirement.

CER TRADING

Ministry of Finance informs DMRC that CERs can be kept by DMRC and are not tied to Japanese credit for metro and can be traded on international carbon markets .

DATA ANALYSIS

1. TO EVALUATE TO THE FINANCIAL FEASIBILITY OF DMRC CDM PROJECT.

To evaluate the financial feasibility of DMRC CDM projects RITES (Rail India Technical and Economic Services) gave a report on Integrated Multi Modal Mass Rapid Transport System (IMMRTS). The estimate is based on past performance of Calcutta metro and suburban sections of the Bombay railway. in the absence of CDM projects DMRC would be in loss

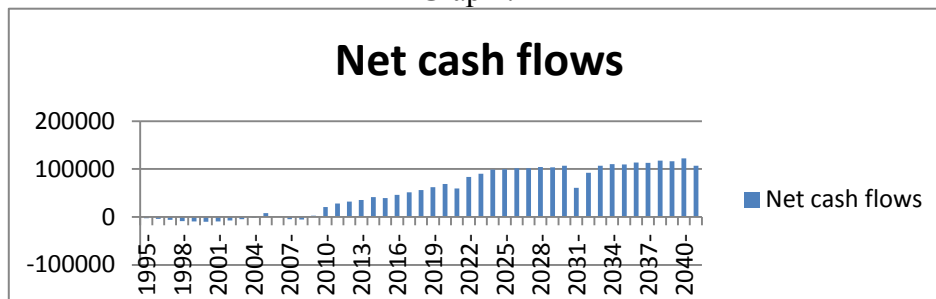
Internationally, of the 135 Metros worldwide, only four make an operating profit apart from Delhi, these are Hong Kong, Taipei, Singapore and Tokyo.

STATEMENT SHOWING THE ESTIMATED NET CASH FLOWS OF DMRC MODEL SHIFT PROJECT Table: 1

year	Net cash flows	year	Net cash flows	year	Net cash flows	year	Net cash flows
1995	-2574	2007	-4391	2019	62416	2031	60769
1996	-3937	2008	-5032	2020	69136	2032	92115
1997	-6036	2009	2886	2021	59678	2033	106615
1998	-8625	2010	20659	2022	83569	2034	110279
1999	-9498	2011	27835	2023	90027	2035	109519
2000	-10110	2012	32330	2024	98636	2036	113695
2001	-9069	2013	35405	2025	99569	2037	112796
2002	-7353	2014	41341	2026	101811	2038	117571
2003	-4917	2015	39704	2027	101522	2039	116498
2004	-1945	2016	45896	2028	104086	2040	121954
2005	7868	2017	51364	2029	103748	2041	106667
2006	1518	2018	56380	2030	106672		

(source : RITES estimate)

Graph : 1



The calculations of these estimated net cash flows results in IRR = 17%

CONCEPT: An attempt has been made to check the financial feasibility of the DMRC CDM PROJECT where the cost of capital is 3% and opportunity cost of capital is 9%.

ANALYSIS: As from the graph and table 5.1 it can be analyzed that though the CDM projects has negative cash flows in the beginning 10 years (gestation period), it results in positive cash flows for the



rest of the life time of the project (37 years) and the calculated IRR of the project is 17% which is above 9% opportunity cost of capital and present cost of capital of 3%.

INFERENCES: The IRR rule states that an investment is acceptable if the IRR exceeds the required rate of return (or the interest rate for discounting purposes) and it should be rejected otherwise.

Since the project IRR exceeds the required rate of return, the DMRC CDM project of modal shift can be accepted.

2. TO ANALYSE THE FUNDING PATTERN OF DMRC CDM PROJECTS

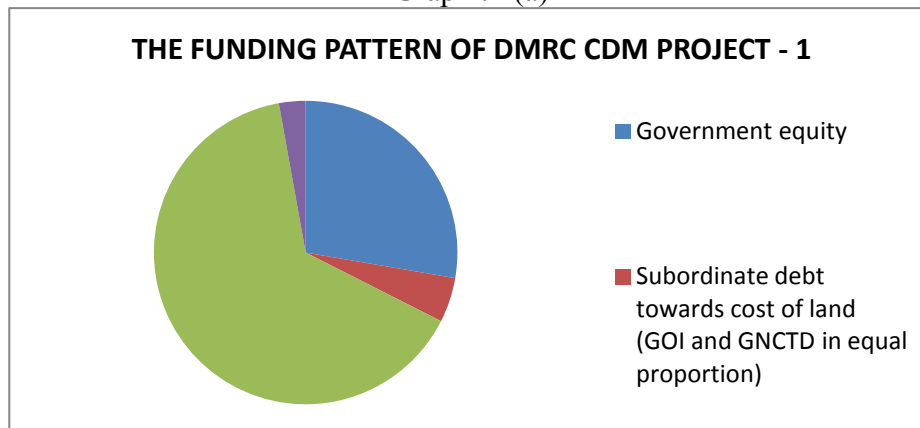
CDM PROJECT 1: “Emission Reduction by Low GHG emitting vehicles”

STATEMENT SHOWING THE SOURCES OF FUNDS TO DMRC CDM PROJECT 1 Table: 2(a)
(rs in crores)

Particulars of investment	Amount (rs)	% level
Government equity (From GOI and GNCTD in equal proportion)	2928.00	28
Subordinate debt towards cost of land (GOI and GNCTD in equal proportion)	504.00	5
JAPANESE BANK FOR INTERNATIONAL COOPERATION(JBIC LOAN)	6839.00	64
Proceeds from property development	300.00	3
Total	10,571.00	100

(Source: DMRC - MRTS)

Graph : 2(a)



CONCEPT: An attempt has been made to find out the funding pattern of DMRC CDM PROJECT “Emission Reduction by Low GHG emitting vehicles”

ANALYSIS:As from the graph, it can be analyzed that the 64% of funds are supplied in the form of JBIC loan from JAPAN (developed country), 28% in the form of government equity, 5% in the form of subordinate debt and 3% in the form of Proceeds from property development

INFERENCE: From the analysis, it can be inferred that majority i.e., 64% of funds are supplied by Japan (developed country)

CDM PROJECT 2: Metro Delhi, India

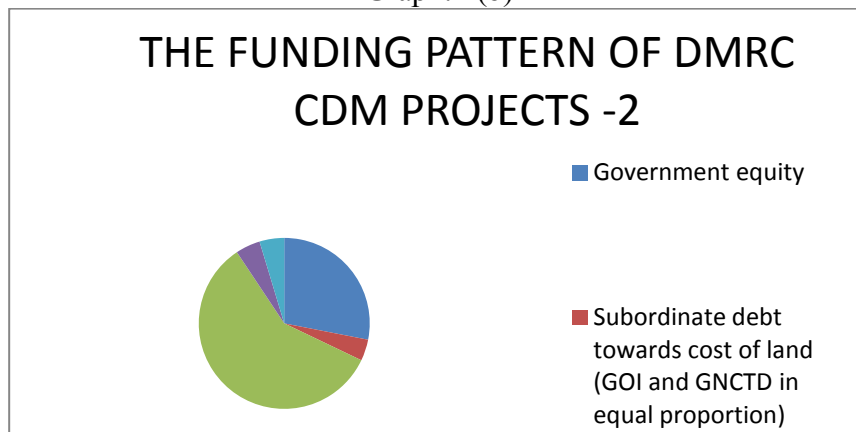


STATEMENT SHOWING THE SOURCES OF FUNDS TO DMRC CDM PROJECT 2 Table:
2(b)
(rs in crores)

Particulars of investment	Amount (rs)	% level
Government equity (From GOI and GNCTD in equal proportion)	2435.00	30
Subordinate debt towards cost of land (GOI and GNCTD in equal proportion)	350.00	4
JAPANESE BANK FOR INTERNATIONAL COOPERATION (JBIC LOAN)	5081.00	56
Proceeds from property development	405.00	5
Internal resources	405.00	5
Total	8676.00	100

(source: DMRC - MRTS)

Graph: 2(b)



CONCEPT: An attempt has been made to find out the funding pattern of DMRC CDM PROJECT of Metro Delhi, India

ANALYSIS: As from the graph, it can be analyzed that the 56% of funds are supplied in the form of JBIC loan from JAPAN (developed country), 30% in the form of government equity, 4% in the form of subordinate debt, 35% in the form of Proceeds from property development and 5% in the form of internal resources.

INFERENCE: From the analysis, it can be inferred that majority i.e., 56% of funds are supplied by Japan (developed country)



3. ANALYSIS OF ECONOMIC BENEFITS FOR DMRC CDM PROJECTS
STATEMENT SHOWING ECONOMIC BENEFITS OF DMRC Table 3

PARTICULARS	AMOUNT
DMRC is EXEMPTED FROM FOLLOWING TAXES :Property tax, Sales tax, Works contract tax, Income taxes Capital gains tax, Customs duty,Excise duty	XXX
Other Concessions to DMRC	XXX
Interest free subordinate loans from: GOI, GNCTD , HUDA, NOIDA	XXX
Exchange rate risk (foreign exchange risk)is borne by Government	XXX
No dividend is paid on GOI share of equity till the senior is repaid fully by the twentieth year	XXX
Electricity at cost to serve basis (300P/kVAh)*	XXX
The DM is permitted to generate resources through property development over a period of 6-20 years	XXX
No dividend is paid on GOI share of equity till the senior debt is repaid fully by the twentieth year	XXX
The cost of land equivalent to Rs. 2180 million has been provided as an interest free subordinate loan by GOI/GNCTD to be repaid by the DM within 5 years after the senior debt is repaid fully by the twentieth year of taking the loan	XXX
Concessional loans from Japan International Cooperation Agency (JICA)	XXX
	XXX

CONCEPT

An attempt has been made to find out the economic benefits of DMRC CDM projects.

ANALYSIS

As from the table, it can be analyzed that the CDM project has resulted in economic benefits of DMRC and hence the cost of capital is just 3%.

INFERENCE:

From the analysis, it can be inferred that in the absences of CDM project metro Delhi, these benefits would not have been available to Delhi metro Rail Corporation.

FINDINGS

From the analysis, it can be inferred that The DMRC CDM project of modal shift can be accepted as the project IRR exceeds the required rate of return.

1. In phase I of DMRC CDM project majority i.e., 64% of funds are supplied by Japan (developed country).
2. In phase II of DMRC CDM project majority i.e., 56% of funds are supplied by Japan (developed country).
3. The CDM project will earn an extra income to DMRC other than its earnings in ridership.
4. In the absences of CDM project metro Delhi, many economic benefits would not have been available to Delhi metro Rail Corporation.



CONCLUSION

CDM and carbon financing is converting an environmental threat to revenue generating opportunity and reduction in overall cost of meeting emission reduction targets to developing countries.

In case of DMRC, there exist two CDM projects. DMRC was the first

Railway project in the world to be registered by the United Nations under the Clean Development Mechanism (CDM) which enabled it to claim carbon credits, wherein DMRC earns CERs for the use of regenerative braking system in its rolling stock (trains). This was the first time in the world that the United Nations Framework Convention on Climate Change (UNFCCC) had registered a project based on regenerative braking.

The project is financed by Japan and the carbon credits earned by DMRC in regenerative rolling stock is purchased by Japan at a price of 1.2 crore per annum.

The Japan uses this carbon credits for meeting its Kyoto requirements and the finance contributes for sustainable development to DMRC and INDIA.

Thus to conclude India has a great opportunity to implementing CDM projects and achieve economic and social profits.

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